Nº 3217 A.D. 1901

Date of Application, 14th Feb., 1901—Accepted, 13th Apr., 1901

COMPLETE SPECIFICATION.

"Obtaining Saponine from Horse-chesnuts"

I, Ludwig Weil of 14 Schifflentstaden, Strassburg, Alsace in the Prussian Empire; Apothecary, do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

It is well known that the nuts of the horse-chestnut tree have on account of the well-known soap-like cleansing properties of their liquid extract long been used for washing purposes without anyone having hitherto succeeded in isolating the substance which produces this effect although the copious frothing of the liquid extract has sometimes been attributed to it containing saponine (see Bohm. "Rearing of Sheep" 1873 pages 445 and 448).

As the large quantity of starch contained in the nuts was frequently found to present considerable drawbacks, especially in washing with hot water, it is not surprising that in using vegetable detergents in large quantities (in which those containing saponine no doubt play the greater part) those have been preferred which not only contain much active substance but also allow it to be utilised as completely as possible, for instance, quillaia bark *(Quillaja saponaria)* developes a much more intense cleansing power than the soap-wort *(Saponaria officinalis)* which is much richer in saponine, because even the structure of the former favours very much the release of the glycosides by means of the dissolving medium. (See Agricultural Annals Vol. 44 pages 153 and *seq.)*

As therefore the cells of the horse-chestnut, full of starch and oil, allow the active substance to be released only in a small degree by aqueous lixiviation, the horse-chestnut has only been regarded as of little detergent value. The bitter ingredient not identified at present, has had hitherto a deleterious influence until very lately in the obtaining of starch from horse chestnuts.

By numerous experiments and preparation of all kinds of substances I have ascertained the saponine contents of horse-chestnuts. It is of special importance to be able by separating the saponine contained therein not only to better utilise this very common and plentiful nut, already valued on account of the starch it contains, but also to make it more available for cleansing purposes. On the other hand, by means of my method of producing, a cleansing and frothing product from this raw material there results a purer saponine which may advantageously replace the ordinary extracts containing saponine in which usually colouring or attendant matters are also contained.

The practical obtaining of saponine from vegetable matter usually depends on its easy solubility in spirits of wine (particularly when hot) and its capability of precipitating from this solution by means of ether. This property which saponine has in common with many other vegetable matters in a greater or less degree, is not of course sufficient to separate it. Thus, products obtained only in this way have eventually been found to be very impure mixtures. It is absolutely necessary to purify products thus obtained and as the other substances may be of the most varied nature according to the chemicals used in the process, the purification must be adapted to the composition of these latter; possibly certain substances can be removed before the saponine is extracted. This is also preferable with horse-chestnuts.

[*Price 8d.*]

Horse-chestnuts as ripe as possible and freshly fallen are opened, the nuts removed and peeled, the moist cotyledons crushed or ground and dried at a temperature of 40° to 50° Centigrade. Oil and resin is extracted from the yellowish-white powder by means of benzine or petroleum spirit in the usual apparatus for extracting fat. The powder freed from oil and from the liquid used in extracting it is macerated for a sufficient length of time with boiling 93 to 96 *per cent.* alcohol (the filtered residues can be used for starch flour). The hot filtered alcoholic extract is concentrated and the abundant thick precipitate which results when cold collected. The mother liquors are further concentrated and subsequently employed for new macerations. The residues, consisting for the most part of saponine are dried in a vacuum, ground up, dissolved again in hot alcohol and this solution treated with freshly precipitated hydroxide of lead (from nitrate of lead and ammonia) for a short time to remove small quantities of vegetable acids and colouring matter which may be present. The hot solution is then poured off and any traces of dissolved sugar precipitated with a little ether. From the filtrate the bulk of the solvent is distilled off, whereupon, on pouring off the concentrated solution into several times its bulk of ether the saponine is thrown down as a white precipitate. This is washed with ether; if necessary the solution and precipitation is repeated according to circumstances one or more times. After drying the saponine is obtained as a white powder which dissolves in water in any proportion forming a strongly frothing liquid and giving all the usual glucoside reactions the saponine produced amounts on an average to 10 *per cent.* to the weight of the nuts used in the process.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

Process for obtaining saponine from horsechestnuts in which the seeds from which the oil has been removed, are macerated with hot alcohol, the precipitate resulting from the cooling of this filtered extract dissolved again in hot alcohol and this solution, after treating with freshly precipitated hydroxide of lead, precipitated with ether, substantially as described.

Dated the 14th day of February 1901.

W. P. THOMPSON & Co
322, High Holborn, London, W.C. Patent Agents for the Applicant.

Redhill: Printed for His Majesty's Stationery Office, by Malcomson & Co., Ltd.—1901.

WELLCOME LIBRARY INSTITUTE